

NEW PUBLICATIONS.

HISTORY OF A BRIDGE

THE WASHINGTON BRIDGE. By William R. Hutton, Chief Engineer, 4to, pp. 100, Illustrated with 63 albotype and lithograph plates. Leo Von Rosenberg.

When the false works are taken away a bridge appears to be, and in fact is, a very simple construction, yet there is nothing in architecture that appeals to us more strongly or fills us with greater admiration than an arched or suspended highway over a mighty stream or across a deep valley. However familiar we may be with the mechanical principles involved, we never shall cease to wonder at the Brooklyn Bridge. Visitors from all parts of the world, no matter what feelings they have, feel that they cannot go away satisfied without having seen that noble example of engineering art. Before it was built the strangers within our gates, guide-book in hand, never thought their tours of observation complete without views of High Bridge. Now we have on exhibition a third bridge. The first was built to unite Brooklyn with New-York by means of footways, carriageways and railways. The object of the second was to bring fresh water into the city. The Washington Bridge was designed to carry across the deep valley of the Harlem a city street. Different as are the purposes of the three, more difficult still are their styles. In the East River structure we have the suspension bridge of modern times, with all its beauties—a web-like affair of wires and steel bars swinging high in air. In High Bridge we have a slightly ornamental adaptation of the simple stone arch of the Romans. The arch is also the feature of the Washington Bridge, but, in keeping with the age, stone has given place to steel.

By the special act of the Legislature providing for the construction of the Washington Bridge the commissioners were authorized to use either stone, steel or iron, or a combination of those materials, and were not limited as to cost. What an opportunity there was here to build a granite viaduct having the greatest merit was for a bridge of masonry; but, much as they had decided that the main spans should be of metal, they were obliged to reject it. A more imposing structure was rejected because the plans provided for its execution in "beton coignet," a material unauthorized by law, being neither stone, steel nor iron. This bridge was to consist of three arches each of 250 feet span, and if it had been accepted we should probably have heard the last of the celebrated Cahn-John Bridge, near Washington, D. C., the largest stone arch in the world. A design for a metal arch of 543 feet span, with masonry approaches, is said to have been preferred by the commission, and its rejection was due solely to its cost, which was estimated at a little over \$3,000,000. Other designs rejected were two suspension bridges of 800 feet span; an iron cantilever of 428 feet span, with approaches on braced iron girders; a structure of masonry of six arches with arches varying from 160 to 210 feet; a cantilever of 580 feet span, with approaches on iron piers and girders; a cantilever on masonry piers, and a cantilever on iron piers with masonry foundations. The cost of these bridges was estimated at from \$800,000 to \$1,000,000.

Finally, after fifteen years of wavering, the plans submitted by C. C. Schneider and W. Hildenbrand were accepted, the first premium being awarded to the former, which was far handsomer as originally presented than the modification turned out by the engineers of the commission. The chief change, however, was the substitution of a plate web for the bracing between the flanges of the arch in the original.

As it stands to-day the Washington Bridge is composed of two steel arches, each of 210 feet span, three piers, two abutments, and approaches, formed chiefly of embankments, supported by retaining walls. These carry a roadway that is nowhere less than 30 feet in width between the parapets, and which connects one hundred-and-eighty-first, with Aqueduct-avenue, 2nd Street, and with the Hudson River.

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